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Fibromyomas of the Uterus

With Report of Seven Hundred Cases Studied Statistically and Pathologically

ELLICE McDONALD, M.D.
NEW YORK

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FIBROMYOMAS OF THE UTERUS

WITH REPORT OF SEVEN HUNDRED CASES STUDIED STATISTICALLY AND PATHOLOGICALLY *

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There has been of late years much discussion and debate about the life-history, dangers and treatment of uterine fibromyomas. The trend of these investigations has been to discredit the traditional or so-called conservative treatment of these tumors. Many facts have been brought out in regard to the dangers, and weighty arguments have been made in favor of their operative cure. The most important changes or complications which have been studied in connection with fibroid tumors is their association with malignant changes either in the tumor itself or in its host, the uterus.

This may have a very direct bearing on the treatment of these tumors, for if it can be proved that there is a large percentage of malignant changes in the growth or dependent on their presence in the uterus a weighty argument has been made in favor of their radical treatment and removal.

The other more grave complications and degenerations of fibroid tumors are those of hemorrhage and necrosis. These are of importance chiefly because of the danger of infection resulting from their existence in the tumor. It is of importance that the percentage of occurrence of these degenerations and the age at which they are likely to occur should be carefully studied, and it is also of importance that the percentage of occurrence should be reckoned at various ages in order to show whether with increasing age there is a disposition for these changes to occur more frequently in fibroid tumors; for if these grave changes of necrosis and cancer occur more frequently with increasing age and occur in a proportionate

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* Read in the Section on Obstetrics and Diseases of Women of the American Medical Association, at the Sixtieth Annual Session, held at Atlantic City, June, 1909.

mortality greater than that of the mortality from operation for fibroid tumors, then the menopause does not bring relief from the trouble of fibroid tumors, but brings more grave dangers, and not a cure.

It has been the custom, since my paper of 1904 on the subject,[1] to collect all the known series and statistics of fibroid tumors and, combining them, to draw deductions from the composite series. This method of estimation of the complications and degenerations of fibromyomas is not without its fallacy. Many of these series, beginning with Martin in 1888, were reported at a time when complete microscopic examination was not made of all tumors, but only in selected cases. In this way many loopholes for error were opened and many complications and degenerations were overlooked. This is particularly true of the complications of cancer and sarcoma, as is shown by Winter's[2] two series. In his first series of 500 cases only the suspicious tumors were examined microscopically and sarcomatous degeneration was found in 3.2 per cent. In his second series of 253 cases in which sections were taken systematically from all tumors, sarcoma was found in 4.3 per cent. Winter believes that if myomas were examined systematically, sarcoma would be found in about 4 per cent. of all series.

The routine microscopic examination is not only of importance in regard to fibroid tumors themselves, but it is also of importance that the adjacent tissues removed at operation, such as ovaries, tubes and appendices, should be carefully examined. It is obvious that this was not the case in many of the series so frequently collected. Cullingworth, in his series of 100 cases, reported no cases of salpingitis, and many of the other series show similar omissions, which makes it clear that complete routine pathologic examination was not made. For this reason it is thought best that, with this series of 700 cases, no other series be combined in order that the facts as to these changes should be as exact as possible. All these tumors here reported were examined pathologically, macroscopically and microscopically, and the adjacent and accompanying tissues removed at operation were also carefully examined. Thus it may be seen that all possible care has been taken to eliminate any source of error.[3] It is much better that conclusions should be drawn from one series of a sufficient number of cases carefully studied than that erroneous deductions should possibly be made from a large aggregation of inexactly studied cases. Therefore, no attempt will be made to combine this series with those of others or to draw comparisons.

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[1] McDonald, Ellice: Complications and Degenerations of Uterine Fibromyomata, The Journal A. M. A., May 21, 1904, xlii, 1344.

[2] Winter: Ztschr. f. Geburtsh. u. Gynäk., 1906, lvii, 1.

These tables include most of 700 cases, 280 of which were reported by me in 1904. The series also includes 26 cases in which myomas were found at autopsy.

The tumors are classified first as regards their character and are recorded in percentages as well as in numbers. They are also classified as to the complications and degenerations and are reckoned in the same way. The age at which the tumors were operated on is also arranged in numbers and percentages as to the various decades. The relation of the necrosis to the age of the patient is also classified and for convenience it is recorded in percentages alone, that is to say the number of cases in each decade can be readily seen from the age table and the frequency of occurrence of each complica- individual complication as a percentage of occurrence in the various decades. This was done with the hope of obtaining some idea of the frequency of each complication at the various ages, in order to show whether the influence of the menopause, which is the only argument for the expectant treatment, was as beneficial as has been claimed. For if it proved that with increasing age the frequency of grave complications increases, a weighty argument in favor of early operation has been made.

AGE

The greatest number of these patients came to operation between 40 and 50 years of age, as may be seen from the table, with a less number between 30 and 40, and still less between 20 and 30. Of all the patients operated on less than 3 per cent. were under 30 years of age.

PATHOLOGY

Number of Tumors Present.—The tumors were single in about one-third of all cases and there was more than one tumor in the uterus in two-thirds more cases.

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[3] These cases were studied at the Bender Laboratory and I am indebted to Dr. Pearce, late director, and Dr. Wolbach, present director, for their help.

TABULAR ANALYSIS OF AGE, COMPLICATIONS AND DEGENERATIONS OF 700 FIBROID TUMORS

TABLE 1.—CHARACTER OF TUMORS

	No.	%		No.	%
Single	238	34	Subserous	136	19.5
Multiple	462	66	Interstitial	190	27.1
Small	257	36.7	Submucous	75	10.7
Medium	209	29.8	Combined	299	42.7
Large	234	33.5			

TABLE 2.—DEGENERATIONS AND MALIGNANT CHANGES

(A.) Degenerations of Tumors	No.	%	*(B.) Associated Malignant Changes*	No.	%
Hyaline	127	18	Adenocarcinoma.	20	2.9
Calcareous	65	9	Squamous carcinoma	6	0.8
Cystic	20	3	Sarcoma	7	1
Hemorrhagic ..	14	2	Chorioepithelioma malignum	2	0.3
Necrotic	57	8	Total malignant changes	35	5
Adenomyoma ..	23	3			

TABLE 3.—COMPLICATIONS OF TUMORS

	No.	%		No.	%
Ovarian cysts...	53	7.5	Salpingitis	194	27.5
Cystic ovaries..	141	20	Appendicitis or Periappendicitis	148	21
Ovarian fibroma	8	1			
Ovarian carcinoma	5	0.7			

TABLE 4.—AGE OF PATIENT

Age.	No.	%	Age.	No.	%
20—30	19	2.7	50—60	95	13
30—40	233	33	60—70	21	3
40—50	332	47.6			

TABLE 5.—RELATION OF AGE TO DEGENERATIONS

(A.) Necrosis

Age.	%
20—30	5
30—40	7.7
40—50	7.5
50—60	9.3
60—70	29

(B.) Calcareous Degeneration

Age.	%
20—30	0
30—40	2
40—50	16
50—60	14
60—70	10

(C.) Hyaline Degeneration

Age.	%
20—30	11
30—40	11.5
40—50	16.8
50—60	16.6
60—70	10

(D). Adenocarcinoma

Age.	%
20—30	0
30—40	0
40—50	3.6
50—60	6.3
60—70	9.5

(E.) Squamous Carcinoma

Age.	%
20—30	0
30—40	0.5
40—50	0.3
50—60	3
60—70	4.6

(F.) Sarcoma

Age.	%
20—30	0
30—40	0
40—50	0.6
50—60	3
60—70	9.5

(G.) Chorioepithelioma

Age.	%
20—30	0
30—40	0
40—50	0.6
50—60	0
60—70	0

(H.) Total Malignant Tumors

Age.	%
20—30	0
30—40	0
40—50	5
50—60	12.7
60—70	23.8
Autopsies	26
Heart Lesions at Autopsy	11.5

This is contrary to the usual belief that myomas are usually solitary, and is an argument against myomectomy when it can be definitely shown that the uterus is not the host of other tumors than the one removed, as, in a number of cases, recurrence of the growth of fibroid tumors after operation has been reported.

Size.—The division as to size has been based on the following scale: small, up to 4 cm.; medium, 4 to 8 cm., and large, above 8 cm. in diameter. In multiple tumors the diameter of the largest tumor was taken as the determining factor. It will be seen that these three classes were almost evenly divided, there being a few more of the small tumors than of the others. The largest tumor noted weighed 90 pounds and measured roughly 50 by 40 by 20 cm. The tumor was removed at autopsy from a woman weighing after the tumor was removed 65 pounds, or less than the tumor itself. The tumor was single, showed considerable necrosis and calcareous degeneration, and caused pressure symptoms which brought on the death of the patient. A history of twenty years' growth was obtained from the family physician. It grew rapidly during the first few years and after it had arrived at the size of a six months' pregnancy it grew slowly, but during this time incapacitated the woman from her customary activities. Several other tumors were noted between 40 and 50 pounds in other cases. It will be noted that 234 tumors, or 33.5 per cent., measured more than 8 cm. in diameter. It will also be seen that at least one-third of the women having fibroid tumors do not come to operation until those tumors have reached a large size.

Position.—Analysis as to position of the tumor was not easy, as it was not always evident to which of the classes the growth should go, but if a tumor projected against the mucous membrane or into the cavity of the uterus it was called submucous, and if the greater part of the tumor was outside the uterine body it was classified as subserous. By combined is meant multiple tumors, one of each of which may be classified in one of the divisions. The comparative infrequency of submucous myomata is noticeable.

Simple Degenerations.—The various degenerations can not be estimated macroscopically, but require careful microscopic examination, as the most common one of hyaline degeneration often shows no macroscopic evidence. Hyaline degeneration occurred in 18 per cent. of all cases, and this degeneration with the increase in the age of the patient, as may be seen from the table, was more frequently found in patients between 40 and 60 years of age.

In sixty-five cases (9 per cent.) calcareous degeneration, on the other hand, was present in very few cases below 40 years of age, and was found most frequently between 40 and 50 years of age with slightly decreasing frequency as the patient became older. The amount of calcareous degeneration varied very much, in one case being almost complete of the womb-stone type, 10 cm. in diameter, and in others with moderate discrete calcareous deposit. An interesting circumstance was the association of calcareous degeneration in six out of twenty cases of fibroids and adenocarcinoma of the uterus.

There were twenty cases (3 per cent.) of cystic degeneration, and a distinction has been made in this series between true cystic degeneration and necrosis going on to cavity formation. In this series the standard of Alban Doran, that if a fibroid is not truly cystic unless it includes the cavity containing half a pint of fluid, has, however, not been adhered to, but tumors with smaller cavities have been judged to be truly cystic. There were no cysts of large size found, the largest containing approximately 1,000 c.c. of fluid. Cystic degeneration is especially interesting from the fact that many cases of cystic degeneration prove to be sarcomatous or it may be that there is a necrosis going on to cyst formation as in Graves' 4 cases of cystic degeneration, of which 3 were sarcomatous, and in Mary Scharlieb's[6] first series of 6 cases of sarcomatous degeneration, of which 3 were cystic, and of her second series of 100 cases, of which 1 showed sarcomatous degeneration and was cystic, and of the 7 cases of sarcomatous degeneration of this series 2 were cystic and 5 showed necrosis and hemorrhage.

Necrosis.—All stages of necrosis and inflammation were noted. Necrosis occurred mainly in large tumors, in which, from the size of the tumor or other cause, the circulation was disturbed, and was evidenced on section by brownish yellow areas. There was usually considerable edema associated. This degeneration was present in fifty-seven cases (8 per cent.) and was found with increasing frequency as age advanced, being present, as is shown by the table of the relation of age to degenerations, in 29 per cent. of patients over 60 years of age, in 9 per cent. between 50 and 60, and less often in the three previous decades. This degeneration is one of the most grave and dangerous changes which may result in a life with fibroid tumors, bringing, as it does, hemorrhage, inflammation, toxemia and peritoneal infection, and for this reason it is important to note that the complications resulted more frequently with increasing age and that the menopause did not bring a relief from this danger, but advancing years increased it.

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[6] Scharlieb, Mary: Jour. Obst. and Gynec., Brit. Emp., October, 1902; Proc. Roy. Soc. Med., December, 1908.

Adenomyoma.—The percentage of these tumors (3 per cent.) is about that usually found. They offered in this series nothing of special mark in gross appearance.

Cancer.—Adenocarcinoma occurred in 20 cases (2.9 per cent.). It occurred in no patient below 40 years of age and was present more frequently as age advanced. The frequent association of this form of cancer with fibroid tumor has been recognized for some years since the more exact methods of examination, and it was noted in my paper of 1904 that "it seemed at least that, while the association of squamous carcinoma with fibroids is accidental, the occurrence of adenocarcinoma may be more or less influenced by the presence of fibroid tumors." This statement has been borne out by many investigators, notably Piquand, who has collected 179 cases of this association and has reported three cases of his own. Isolated cases, however, have little value or bearing on the treatment, for it must be proved that the liability to cancer is of sufficient importance to constitute an indication for the routine removal of these growths, and to do this, not only must the total number of cases be noted, but the varying percentages of the forms of cancer and the age at which they occur.

Squamous carcinoma was present as an association of fibroid tumors in 0.8 per cent. of cases, and the frequency of this association also increased with increasing age, being present in only one case below 40 years of age, in 0.3 per cent. between 40 and 50, in 3 per cent. between 50 and 60, and in 4.6 per cent. between 60 and 70.

From a comparison of these two forms of cancer it will be noted that, while twenty cases of adenocarcinoma occur as a complication of fibroids, only six cases of squamous carcinoma of the cervix are present. In other words, there are three times as many cases of adenocarcinoma as there are of squamous carcinoma. This proportion is entirely the reverse of the usual proportional occurrence of these two forms of cancer, as is shown by Piquand's collection of 1,135 cases of uterine cancer in which he found 100 cases of squamous carcinoma to every 17 cases of adenocarcinoma.

It is obvious, therefore, that, while adenocarcinoma is relatively more frequently in association with fibroid tumors than is squamous carcinoma, this relationship may result from a common etiologic factor, or the fibroids may predispose toward the occurrence of adenocarcinoma of the fundus. The fact that myoma of the uterus, as is well known, predisposes toward sterility and that squamous carcinoma is found but seldom in women who have never had children may have something to do with the apparent frequency of adenocarcinoma. In other words, women who have fibroids have no children, and so are not likely to have squamous carcinoma of the cervix. It is, however, believed that the percentage of sterility in fibroid tumors is much exaggerated and that pregnancy very often occurs with an undetected fibroid.

It may be that the common etiologic factor is in the uterus itself and that there is some quality in the organ which makes it liable to become the seat of fibroids and malignant disease. While a common etiologic factor may play a part in the association of these forms of disease, it is probable that the fibroids have some part in the production of this association, and, while fibroids may bear a causal relation to, or have a common cause with adenocarcinoma, the association with squamous carcinoma is accidental, and, while the etiologic relation of the combination of adenocarcinoma with fibroids is obscure, the fact of the large percentage of this complication remains to be taken into account in regard to the treatment of these growths.

Sarcomatous Degeneration.—There are seven cases of sarcomatous degeneration among the 700 fibroid tumors. During the time the seven cases of sarcomatous degeneration were observed, there were twelve other cases of sarcoma of the uterus. It is difficult in some cases to decide whether a fibroid tumor has previously existed in the uterus which is now the seat of extensive malignant disease, for the destruction of the malignant lesion may have caused a disappearance of the fibroid growth or the growth itself may have created tumor formation to simulate the necrotic remains of a fibroid. This is particularly true of sarcomatous disease, and the small percentage in this series compared with others may be due unless it was distinctly shown that there was a true to the fact that no tumor was included in this series sarcomatous degeneration.

This form of degeneration occurred in no patient below 40 years of age, and, as may be seen from the table, it was present between 50 and 60 years in 3 per cent. and between 60 and 70 years in 9.5 per cent. of the cases.

The most marked characteristic of this form of degeneration was the fact that it was almost constantly associated with necrosis or hemorrhage. In fact, the presence of these two conditions should be made an indication for the very careful examination of all the suspicious spots in such tumors. The importance of this examination is well shown by the report of Winter's two series which were referred to above.

Chorioepithelioma Malignum.—There are two instances of this complication, both occurring after abortion and one infiltrated in the substance of the fibroid tumor. The complication is a rare one and is mainly of interest because of its rarity.

TOTAL MALIGNANT COMPLICATIONS

The total number and percentage of malignant complications of 700 fibroid tumors were 5 per cent., including 20 cases of adenocarcinoma, 6 of squamous carcinoma, 7 of sarcoma and 2 of chorioepithelioma malignum. Of these 35 cases, 27—those of adenocarcinoma and sarcoma—were due to or influenced by the presence of fibroid tumors, while 8 cases—those of squamous carcinoma and chorioepithelioma malignum—were of accidental association; that is, their occurrence was not influenced by the presence of the fibroid tumors.

There was but one case of malignant complication in a patient below 40 years of age. With each decade after 40, the percentage of malignancy increased markedly, being 5 per cent. in the fifth and 12.7 per cent. in the sixth, and 23.8 per cent. in the seventh.

Ovarian Complications.—Parovarian and ovarian cysts have been combined in this classification and occurred in 53 cases (7.5 per cent.) and varied in size. Ovarian fibromas occurred in eight cases (1 per cent.), the largest measured 20 by 11 by 10 cm. There were five cases of ovarian carcinoma, and in three instances the growths were due to metastasis from a gastric tumor. Cystic ovaries (one or both) were present in 141 cases (20 per cent.); the percentage corresponded very closely with Scharlieb's estimation of this complication. This is thought to be due to the undue thickness or toughness of the ovarian boundaries, as there is in almost all these ovaries an increase in the amount of fibrous tissue.

Tubal Complications.—The tubes showed salpingitis or perisalpingitis in 149 cases (27.5 per cent.). In many cases the gross changes were slight and the diagnosis made microscopically. The cases of purulent salpingitis, pyosalpinx, tubo-uterine abscess, have been classed under this head. This large complication of tubal complications as compared with the small percentage of similar complications found in series in which not all the tissues were examined microscopically shows that the tendency in the tubes is toward inflammatory processes of minor grade which may show but little macroscopic evidence, and it is believed that salpingitis as an association of fibroid tumors is very frequently overlooked because of this lack of macroscopic change.

Appendiceal Complications.—Appendicitis or periappendicitis occurred in association with fibroid tumors in 148 cases (21 per cent.). The most frequent form of this complication was that of periappendicitis and very frequently the inflammation was of slight grade and with small macroscopic change. Both this complication and that of salpingitis, however, show that the evil effect of fibroid tumors of the uterus is not confined to the uterus, but is transmitted to the adjacent and easily affected tissues. It is believed that the evil effect of fibroid tumors on the tubes and appendix is largely mechanical in origin and that to the bruising or traumatism, caused by the presence of a large tumor, may be attributed the moderate inflammatory changes.

Cardiovascular Changes.—A study of diseases of the heart and vessels in patients with fibroid tumors is one which is fraught with great difficulty because of the trouble of making a positive and accurate diagnosis of the heart lesion and of the relation which the lesion bears to the fibroid tumor. Many reports have been made in which the examination of the heart has been made in the most precursory manner and broad conclusions drawn from insufficient evidence. The frequency of functional murmurs of the heart in cases of anemia caused by excessive menstruation or bleeding from fibroid tumors is one of the complications of the diagnosis, so that it must be laid down as a rule in a study of the cardiovascular changes associated with fibroid tumors that only autopsy reports or examination by a skilled physician in regard to the condition of the heart should be accepted in the study of the condition.

In this series fibroid tumors were found in 26 women at autopsy. These fibroids occurred among 175 autopsies on women more than twenty years of age; that is, above the age at which fibroid tumors occur. In these 26 autopsies of women with fibroid disease of the uterus, heart lesions were found in three cases (11.5 per cent.). In one case there was fibroid degeneration of the heart muscle with a large tumor which by pressure had caused hydroureter and various congestions with edema of the lungs. Another patient had mitral stenosis, and death was due to anemia and nephritis caused by excessive hemorrhages. In the third case, there was aortic stenosis and mitral insufficiency; death was caused by acute peritonitis caused by rupture of the bladder from obstruction by fibroids.

The cardiovascular tissues are in no way affected by fibroid tumors, but the changes which do occur are due to excessive menstruation or persistent hemorrhage which cause anemia and exhaustion. The changes are secondary to the anemia from hemorrhage or to malnutrition, superinduced either by hemorrhage or by other disturbances caused by the fibroids. But there is no proof that there is any definite or specific influence of a fibroid tumor on the heart or blood vessels other than that produced through anemia and the blood changes.

FIBROID TUMORS AND PREGNANCY

The influence of fibroid tumors on pregnancy must be considered not only from the effect of the tumor on the pregnancy, but also from the effect of the pregnancy on the tumor. In another series of 2,600 cases of pregnancy, 13 cases (0.5 per cent.) of associated pregnancy and fibroids were studied. Among these 13 cases complicated by fibroids, there were 3 cases of postpartum hemorrhage; one was severe at the time of labor, necessitating manual extraction of the placenta and uterine packing. Two were insidious in character, the uterus contracting well at the time of the delivery of the placenta and bleeding in from one to one and a half hours afterward. In three cases the placenta was difficult of delivery, two requiring vigorous treatment by Credé's method and one manual extraction on account of adhesions to a large fibroid which projected into the uterine cavity and to which the placenta was densely adherent.

In three cases there was malposition of the fetus. This was of minor degree in two and was easily corrected manually. The third case was one in which the uterus was the host of two large fibroids. One of these was the size of a fetal head and situated at the fundus; it was pediculated and freely movable. The other tumor was in the posterior part of the lower segment of the uterus and was the size of an orange. It was fixed and obstructed labor. The child lay transversely and the patient had been sent to the hospital with the diagnosis of placenta prævia on account of the hemorrhage. Cesarean hysterectomy was done and a macerated fetus delivered.

One case of fibroids was seen after a three months' abortion; owing to the retroversion of the uterus and the anterior situation of the fibroid, the diagnosis was between fibroid tumor and ectopic pregnancy. Abdominal section disclosed the true condition, however.

According to Routh, miscarriage occurs in 21 per cent. of all cases of pregnancy with fibroids. It occurred in but one of the thirteen cases.

The condition of the placenta in these cases is of interest. In five cases there were areas of necrosis varying in size from 3 to 6 cm. in diameter; in two cases it was very marked and involved the whole thickness of the placenta. The case in which the placenta was manually extracted had this condition in the most marked degree. It was adherent to the fibroid tumor and at the site of attachment of the placenta to the fibroid there was marked thinning of the placental tissue. In several other cases there were placental infarcts and one was the seat of the moderate calcareous degeneration.

Four of these patients were carefully examined before and after labor, and again one month after the date of labor, with the idea of determining whether there was any decrease in the size of the tumor in the puerperium. Two cases of interstitial fibroids showed a marked decrease in size, while one was decreased but little. One case of a pediculated fibroid, as large as a Maltese orange, showed little or no change.

From these cases it will be seen that, while obstruction to labor from cervical fibroids is the most dangerous complication, it is not the only one to be dreaded. Postpartum hemorrhage, malposition and infection are not uncommon. Malnutrition of the fetus caused by areas of degeneration in the placenta may be the cause of premature labor and death of the child. The placenta may be adherent to the tumor on the site of degeneration.

With this series of 700 cases of fibroids, pregnancy was associated in 16 cases. In one case it was apparently the cause of marked increase in growth, followed by necrosis of the tumor. In three of the cases there was moderate increase in growth and necrosis, and in almost all of the cases there was marked increase in the symptoms.

The influence of pregnancy on a fibroid tumor is usually an evil one, and, if miscarriage occurs, it is likely that particles of placental tissue may remain attached to the wall of the uterus. If early abortion does not result, increase of growth of the tumor is a common result, and this is frequently associated with other disturbances, as necrosis and hemorrhage into the substance of the tumor. The two cases of chorioepithelioma associated with fibroids occurred after early miscarriage.

CONCLUSIONS

From these statistics and tables it is possible to draw certain definite conclusions. The tables show that fibroid tumors are subject in a large percentage of cases to a number of dangerous changes and complications. These dangers are almost all increased correspondingly with the age of the patient. This is particularly true of the more dangerous and even fatal complications of malignancy and necrosis.

In consideration of malignancy alone it is probable that malignant changes will result in one case in every 20 of patients between the ages of 40 and 50, one case in every 8 of patients between the ages of 50 and 60, and one case in every 4 of patients between the ages of 60 and 70.

Necrosis, which constitutes one of the most dangerous degenerations, was present in 8 per cent. of all cases. It was found with increasing frequency as the age of the patient advanced and increased with age until it was found in one-third of all cases at about 60 years of age. When it is considered that necrosis can not exist for a long period without producing marked symptoms and causing grave danger to the patient from infection of the tumor and adjacent tissues, it is obvious that an early operation must be considered the only preventive and safeguard against this danger.

It is obvious also that, if the percentage of degenerations and complications increase with age, the patient's risk in respect to the fibroid tumor and the dangers to which she is exposed therefrom also increase with age and that the menopause does not bring a cure to patients with fibroids, but exposes them to graver dangers. The menopause may relieve the hemorrhage from fibroid tumors, but it does not in any way benefit the tumor or lessen its possibilities for evil. The menopause itself is most commonly delayed in such cases.

In view, then, of the large percentage of serious degenerations and complications of fibroid tumors and of the great increase of malignant and other complications with age, it seems wise that a physician should advise all patients who have fibroid tumors to have these growths removed; for if they are not removed the probabilities are that the dangers from them will increase with age. It is true that up to the age of 40 years the danger from malignant complications is slight; but before that time the patient is exposed to the occurrence of other grave degenerations.

Those adhering to the classical teaching advise that the tumors should be treated expectantly and that operation should not be undertaken until serious symptoms result. The most serious complications are those of necrosis and malignancy. Where these distinctive symptoms by which the advent of these changes in fibroid tumors could be recognized. the dangers of conservative and expectant treatment might be decreased; but who can say if a fibroid has become sarcomatous or how long a cancer will be confined to the uterus? Sarcoma often occurs without increase of a growth or fibroid, and adenocarcinoma may cause but little additional discharge or hemorrhage in a case of fibroids which has excessive menstruation or bleeding. Necrosis, after its advent in a fibroid, quickly advances, and, after necrosis has set in, the dangers of operation from infection are very markedly increased. It is obvious, therefore, that it is advisable to operate on the patients with fibroid tumors before these conditions occur, as there is no means of prognosticating when they may occur, save that the probability is that the percentage of their occurrence will increase with age, so that operation can not be deferred.

The expectant treatment offers nothing toward the cure of fibroid tumors save the hope that menopause will obliterate some of the symptoms. Treatment by electricity and ergot has fallen deservedly into disuse and the hope of cure by the menopause is now known to be fallacious. Were those advocating the conservative treatment to take a stand more properly based on the known facts in the life-history of fibroid tumors, they would advocate the delay of operation until the patient approached the age of 40 years, after which the percentage of more dangerous complications is very markedly increased. The prevention of these many grave dangers is better, however, than the risk of their occurrence, and it is safer that all patients with fibroids should be operated on as soon as possible. In this way but few patients would present themselves for operation below 30 years of age, and in this series there was less than 3 per cent. of patients operated on. After that time but one-third of all patients would be operated on below 40 years of age, so it may be seen that the difference of position between those advocating operation below 40 years of age and those advocating immediate operation is not very great. If operation is done before the grave complications occur, the mortality will be correspondingly low. The case with regard to fibroid tumors is analogous to that of appendicitis. When the operation is one of choice and there are no acute symptoms present, the mortality is very low; when there are acute symptoms, such as necrosis or weakness from marked hemorrhage, the mortality is large. Early operation would reduce the probability of death from embolism, which is relatively so common after operations on fibroids, and there would be but little risk from the cardiovascular and other systemic diseases.

The frequency of inflammatory changes in the Fallopian tubes and appendix, although as a rule they are of mild grade, should be taken into account. If there is inflammatory disease present in more than one-fifth of all cases of fibroid tumors, care should be taken to eliminate this danger at operation and to do such an operation as would offer little possibility of postoperative infection. Myomectomy, while the ideal operation, is for this reason often contraindicated, as the dead spaces caused by the removal of a tumor offer a situation for infection.

It is also of the greatest importance that all fibroid tumors removed at operation should be immediately opened by an assistant and examined macroscopically for the presence of adenocarcinoma or sarcoma. These two forms of degeneration may with some experience be usually recognized macroscopically, and these are the forms of malignant disease which may come to operation undiagnosed. Their situation in the interior of the uterus, the presence of the fibroid tumor formation and the fact that hemorrhage is already present make the diagnosis obscure. Squamous carcinoma, on the other hand, is more readily recognized on account of its cervical position and the possibility of direct examination.

If, then, on examinaton of the tumor or uterus, signs of malignancy are found, a complete hysterectomy may be done. It should be remembered that after 40 years of age the probability of malignant change is much increased.

SUMMARY

1. The menopause does not bring a cure to fibroids; on the contrary, increasing age increases the danger from these growths.

2. There is little danger of malignancy arising in fibroids before the fortieth year of the patient, after which time the danger increases with each year.

3. In view of the sarcomatous changes, carcinomatous associations and other degenerations of uterine fibromyomas, early removal is indicated when they are sufficient size to produce symptoms and cause the pa-

tients to seek advice. Small uncomplicated fibroids in young women do not require early treatment.

4. Thorough pathologic examination should be made of all fibroids for evidence of malignancy. The tumor should be opened at the time of operation and examined for adenocarcinoma or sarcoma. Particular study should be devoted to those tumors which are necrotic, cystic, or both, as among these are found the largest proportion of malignant changes.

5. In view of the large percentage of inflammatory changes in the Fallopian tubes and appendix, these should be examined at the time of operation and removed, if diseased.

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